

Universal Task Documentation

Universal Automation Center support for scheduling
docker container

Ut-docker-cli-exec-linux

Associated Activities:

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CONFIDENTIALITY INFORMATION

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Revision	Date	Author	Changes
00	20180814	Nils Buer	Initial Document (WIP)
01	20180814	KM	Update for first 5 Tasks
02	20180821	Nils Buer	Testcases added

Abstract:

The here described Universal Tasks allows operate your docker container and schedule docker container-based applications as part of any existing or new scheduling workflow.

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1 Disclaimer

No support and no warranty are provided by Stonebranch GmbH for this document and the related Universal Task. The use of this document and the related Universal Task is on your own risk.

Before using this task in a production system, please perform extensive testing.

Stonebranch GmbH assumes no liability for damage caused by the performance of the Universal Tasks

2 Scope

This document provides a documentation how to install and use the Universal Tasks for docker container. If more Task will be created in the future this document will be updated accordingly.

3 Introduction

Universal Automation Center seamlessly integrates your legacy system into your container-based DevOps process without the need to re-design your business process logic, resulting in a shorter time-to-market, improved customer satisfaction, better product quality, more reliable releases, improved productivity and efficiency. As a result, you can make use of all the benefits provided by containers like **portability** from applications, **simplified integration**, **optimized development**, **increased scalability** and **performance**, while at the same time minimizing the risk while introducing a new technology.

Security is an important topic, when working with Containers. Containers are more or less isolated from the host OS system, but they use the same kernel. Due to potential security risks a Container should be executed in most cases using a non-privileged user account. In some cases, it might however be needed to use some kernel functionalities e.g. when mounting e.g. a USB drive. Universal Automation Center allows to centrally maintain individual credentials for each container and provides to start a container using the `--privileged` flag where needed.

Central Management of all user and groups with support for SAML, SSL LDAP/AD for legacy and containerized applications

Central Management of all Application Credentials and Connections e.g. SAP and Database connections, script credentials ...

Central Management of all credentials used to connect to a registry

Our security concept is constantly validated by external BSI certified security companies

Some details about the universal tasks for docker container:

- The here described Universal Tasks are calling the native docker cli. Universal Tasks based on the docker python SDK will be described in a separate document.
- Currently the most important docker cli commands have been implemented. Any missing command can be provided on request or created by the user itself based on an existing task.
- The current Universal Task require a Linux Agent for running the Universal Tasks scripts
- The docker private- and public registry are support. Other registries can be added with minimal efforts.
- Credentials can be provided for each task individually e.g. docker login, user executing the container, you can pass credentials for applications running in the container, ..
- You can select different log-levels e.g. debug

Note:

For details on each docker cli command refer to the docker documentation:

<https://docs.docker.com/engine/reference/commandline/docker/>

4 Installation

4.1 Software Requirements

Universal Task name: *ut-docker-cli-exec-linux*

Related UAC XML Files for template and task: *Github repository*

Software used:

For the set-up you need:

1. Universal Controller 6.4.5.x (any platform: Linux, Windows or SaaS Cloud)
2. Universal Agent 6.4.2.2 or higher installed on a Linux Server
3. Docker engine with version 17.09.1-c or higher installed on a Linux server

4.2 Installation Steps

The following describes the installation steps:

1. Install the docker engine and a Universal Agent on a Linux Server e.g. Open SUSE

The following provides a sample set-up for Open SUSE. For other Linux distribution the set-up is similar (check with google). The set-up is provided here to have some guidance on the general step. The steps may vary depending on your landscape.

Install Agent on docker engine

```
sh ./unvinst --network_provider oms --oms_servers 7878@<oms_ip> --oms_port 7878 --  
oms_autostart no --ac_netname OPSAUTOCONF --opscli yes
```

where:

- <oms_ip> is the IP or hostname of your oms server.
- 7878 is the default oms port

update repro

```
zypper update
```

install docker engine package

```
zypper in docker
```

Start the Docker daemon.

```
systemctl start docker
```

start the docker daemon at boot

```
systemctl enable docker
```

Create new docker user

The docker package creates a new group named docker. Users, other than root user, must be part of this group to interact with the Docker daemon. You can add users with this command syntax:

```
sudo /usr/sbin/usermod -a -G docker <linux_user>
```

```
sudo /usr/sbin/usermod -a -G docker ubroker
```

enable external network access

OpenSuse: Network Devices -> Network Settings -> Routing menu (f) and check the Enable IPv4 Forwarding box.

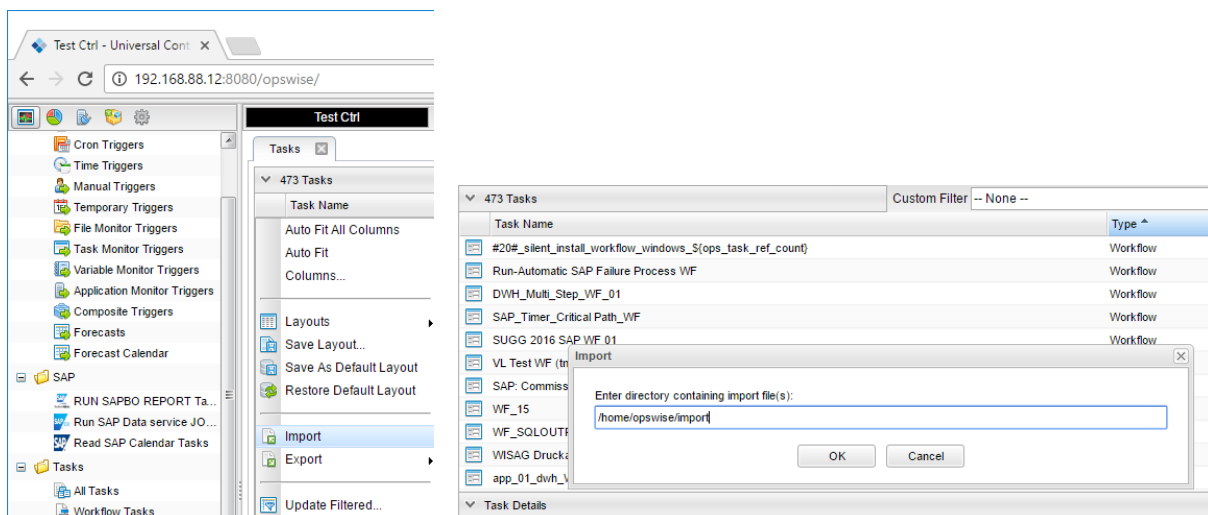
Test the Docker installation.

Type in a command shell:

```
docker run ubuntu /bin/echo 'Hello world'
```

2. Import each docker-cli Universal Task including the Universal Template to your Controller

Go to “All Tasks” and load via the Import functionality the Universal Task configuration into the Controller.



5 Universal Task Configuration

1. Activate: Resolvable Credentials in Universal Automation Center:

Dashboards	RUN SAPBO REPORT Tasks	Properties
93 Properties		
Name	Value	
Resolvable Credentials Permitted	true	

2. Fill Out the Universal Task for each docker cli command, which you want to execute:

In the example below the Task to pull a docker image “*ut-docker-cli-pull-linux*” is shown.

docker pull images - docker cli Task Details: docker pull private registry - docker cli

Update Launch Task View Parents Copy Delete Refresh Close

docker pull images - docker cli Task Variables Actions Virtual Resources Mutually Exclusive Instances Triggers Notes Versions

General

Task Name: docker pull private registry - docker cli **Version:** 14

Task Description: Pull an image or a repository from a registry

Member of Business Services:

Resolve Name Immediately: ☐

Hold on Start: ☐

Virtual Resource Priority: 10 **Hold Resources on Failure:** ☐

Further Info's: <https://docs.docker.com/engine/reference/commandline/pull/>

System:

docker pull images - docker cli Details

Agent: docker LX AGNT **Agent Cluster:**

Agent Variable: ☐ **Agent Cluster Variable:** ☐

Credentials: ☐ **Cluster Broadcast:** ☐

registry_credentials: docker_hub_001 **image_name:** nilsbuer/sb

img_version: ☐ **versionselect:** latest_version

debug: Yes **registry:** private docker hub

Fill out or select the required Credentials e.g. for docker private registry.

In the example below the *docker registry* credentials are shown:

Credential Details: docker_hub_001

Update Convert... Delete Refresh Close

Credential Versions

Details

Name: docker_hub_001 **Version:** 6

Type: Resolvable

Runtime User: nilsbuer

Runtime Password:

Description: Credentials for the private docker hub

6 Universal Tasks for Docker Container

The following chapter describes the provided docker-cli Universal Tasks.

6.1 Run a command in a container

N#	CMD	Docker CLI	UT-Name
11	Run a command in a running container	exec	ut-docker-cli-exec-linux

Task Screenshot:

The screenshot shows a web-based configuration interface for a task named 'docker exec - docker cli'. The interface has a top toolbar with buttons like 'Update', 'Launch Task', 'View Parents', 'Copy', 'Delete', 'Refresh', and 'Close'. Below the toolbar are tabs for 'Variables', 'Actions', 'Virtual Resources', 'Mutually Exclusive', 'Instances', 'Triggers', 'Notes', and 'Versions'. The 'General' tab is active, showing fields for 'Task Name' (docker exec - docker cli), 'Version' (2), 'Task Description', 'Member of Business', 'Services', 'Resolve Name', 'Hold on Start', 'Virtual Resource', 'Priority' (10), 'Further Info's', and 'System'. Below this is the 'docker exec - docker cli Details' section, which is divided into two columns. The left column contains fields for 'Agent' (set to \${docker_LX_AGNT}), 'Agent Variable' (checked), 'Credentials', 'Credentials Variable', 'debug' (No), 'detach' (false), 'privileged' (false), 'user', and 'detachkeys'. The right column contains fields for 'Agent Cluster', 'Agent Cluster Variable', 'Cluster Broadcast', 'container_name' (test), 'interactive' (true), 'tty' (false), and 'command with arguments' (echo hello world).

Figure 1: Universal Task to run a command in a container

Field Description:

Field	Required	Description
Agent	Mandatory	The Linux Universal Agent, which runs on the server, where the docker cli is installed.
Credentials	Optional	The Credentials used on the Linux Server.
Debug	Mandatory	Enable debugging mode (default is No)
Detach	Optional	detach=true false ; Detached mode: run command in the background. The default is false.

Field	Required	Description
Privileged	Mandatory	privileged=true false ; Without this flag, the process run by docker exec in a running container
User	Optional	user="" ; Sets the username or UID used and optionally the groupname or GID for the specified
Detachkeys	Mandatory	detach-keys="" ; Override the key sequence for detaching a container. Format is a single
Container_name	Mandatory	Name of the container
Interactive	Mandatory	interactive=true false ; Keep STDIN open even if not attached. The default is false.
tty	Mandatory	tty=true false ; Allocate a pseudo-TTY. The default is false.
Command with arguments	Optional	Command to execute in the container

7 Test Cases

The following basic test cases has been performed:

Case	Assumed behavior	Result
Run a command in a running container <ul style="list-style-type: none">Detach: falsePrivileged: falseContainer_name: testInteractive: trueCommand: echo hello worldTty: false	Runs the command echo hello world in the container test	correct

8 Document References

There are no document references.